CalPERS ASSET LIABILITY MANAGEMENT WORKSHOP
SEGMENT 4

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Host: Chairman George Diehr
Guests: Robert McCrory, Richard Roth, Allan Milligan

George Diehr:
Two comments about our vote. The vote that we took about adopting the new classification or structure was, oh, it's a preference, it was not a formal motion because we're notice of that. So, we were expressing a preference, which is the same thing we will do tomorrow when we look at actual asset allocations, portfolios, we'll be expressing a preference. But the final decisions will come at the December meeting, I guess.

Farouki Majeed:
December.

George Diehr:
Yes. Okay.

Farouki Majeed:
Yes.

George Diehr:
Okay.

George Diehr:
Yes, that's right. Yes. Preference and guidance to the staff. All right. So, now, we are at decision factors. With McCrory.

Robert McCrory:
Thank you.

George Diehr:
Bob.

Robert McCrory:
Thank you. Just introduced myself. I'm Bob McCrory. I'm Bob McCrory. I'm a consulting actuary with EFI Actuaries, and have been working with CalPERS for getting near 20 years now in one way or another, as auditor, and then also in this asset liability workshop. What we're going to be doing here is, I'm going to be moving through my slides. I know that I'll do it wrong. And I'm also going to be using the laser pointer so it won't show up on the video. And we'll start by, just looking quickly, we're going to do. Well I have to point over there don't I? Okay. We're going to briefly summarize the overall process here. We're going to talk about decision factors. Sounds like a technical term. It's really just what you

care about. That's all a decision factor is. I'll be talking about it conceptually. Rick will go into detail. And, and to the application of decision factors, Rick's going to talk about I think a really creative way the investment office has decided to come up a way to enhance the rule of risk in this entire process through a selection of returns from two different regimes. So I think it's really kind of a cool thing to do.

Then we'll talk about the scoring process that we use. And, sort of set the table for what you'll be doing tomorrow when you select the, how you, what the things you care about and how you prioritize them. And that will determine your asset allocation. So, let me try to make some of that a little bit more concrete.

The overall process is straight out of an operations research textbook. Okay? And that's what this is, what motivates this. It's a process of three steps: modeling, measurement, and optimization. What we do is we look at a system that we're interested in. In this case it's the PERF. And we build as good a model of it as we possibly can. Now, there's been some discussion about quantitative models, and the way quantitative models have let us down. It's important to note that while this is a quantitative model, it's not a mathematical model. And, mathematical models such as the ones that let us down on Wall Street frequently depend on mathematics that pose a large number of hypotheses such as the efficient market hypothesis and diversification and distributions of returns and correlations and so forth, which tend to hold in the breach rather than in actuality. But what we did was we built a simulation model where we actually encoded the structure, the benefits, the actuarial valuation process, the actuarial asset smoothing process of CalPERS into our computer. And, yes, it somewhat simplified, but it doe include all 2,000 plans, it does include all of the people, it does include the difference in the benefit structure, it does include the actuarial funding processes that Allan has put in place, along with the rest of his staff, to compute the employer contributions.

So that's the modeling process to build as good a computer model as we possibly can of the system. Measurement is to use the model to measure things we care about. And, in general what we care about are the things that we've been talking about. We care about the employer cost. Very important. We talk about the funded ratio. And that can, that's very important, too. Those are probably the two major issues that we're interested in looking at. Oddly enough, in one sense we don't care all that much about the return. I mean, if you have cost that's going down, and a funded ratio that's going up, you may not care that much what the return is doing. And, in fact, there was one pathological example where the return went up and the cost went up, too. And that was the state of Oregon in the late 1990's. Any, anyone who wants that story, if you're really that bored, you can come see me later.

So, we're going to measure the things we care about. That's the measurement process. And we'll be able to assess the impact on different asset allocations on

those measurements. Given an asset allocation, run it through the model, which means that we're running it through all 2,000 plans, we're running it through one and a quarter million people, we're running it through Allan's office, which has also simulated an outcomes projected, or simulated, I should say, funded ratios and costs.

Now, having done that, we can invert the process and say, okay, now given our goals with regard to funded ratio and cost, what asset allocation maybe does the best job to meeting those. And that's tomorrow's function, is to select among competing asset allocations based on how they perform using this model.

So that's going to be the overall process. Now, in terms of the model. Let's see. There. I keep. I always look at the wrong place. Now, here, there. Did I get it? Yeah. You're much better at this than I am.

As I said, the main model is built to simulate Allan and his office and generate actuarial practices in line with what the board has adopted in Allan and his people are implementing. One of the things that's done though is that we are going to be reporting funded ratios to you based on market value of assets, not on smooth or actuarial value of assets. Everyone seems to think, including the actuarial profession, that that's a sounder way of reporting that.

Rick now is going to talk about the, as I said, I think a pretty creative approach to sort of increasing the emphasis on risk.

Richard Roth:
All right. Thanks, Bob. I'm just going to move this ahead here. That's too far. All right. So, Bob mentioned that for this workshop we want to use two return distributions. In the past we've used just one. So we want to consider both the expected outcomes based on the capital market assumptions presented June 2010. As well as a scenario of lower return outcomes. So, again, the base case, we call one the base case. That's using the capital market assumptions, again, that were presented June 2010. And then we've also constructed a 30% weak growth return distribution, which recognizes that the likelihood of recessions occurring on a more frequent basis.

And, earlier, Mr. Jelincic asked the question about how valid is it to assume this direct link, or linear link between risk and return? Well, sometimes we all agree that relationship breaks down. And one way to lesson that relationship or relax it is to use this 30% weak growth case. So that was part of the reason for doing that. The effect of actually using the low return distribution, as well as the base case distribution can be seen in graphs, or what we call candlestick charts, of funded ratio and employer contribution rates, and that's what Bob will go over next.

Robert McCrory:

Thank you. I'm going to go over four of these candlestick charts. And I'll take a few extra minutes on this one just to make sure that you understand what's being shown.

On the horizontal axis, here, we have eight different portfolios represented by a number. On the vertical axis, in this particular case, we have the funded ration that's going to exist in ten years, at the end of ten years of our simulation. The candlestick at each point. Oh. What did I do now? Okay, that's good. The candlestick goes from 20 percentile, 80th percentile. So this represents about 60% of the cases in this body of the candlestick. This is the top ten percentile, and this is the 90th percentile down here.

So we see that Portfolio One, the range is from, what, 80% likely to be between 80% funded and maybe 45% funded at the end of ten years. The median value is right here at about 59%.

Now, as the current funded ratio is 65% and you can see that there's actually built into these particular portfolios, at least the first four, the median funded ratio at the end of ten years will be below the current funded ratio. And that's one of the reasons for that is that the average return on these portfolios is below the seven and three quarters percent we're assuming here. So this is our current level here.

You'll notice that over time, not over time. I beg your pardon. That as the portfolios get higher in number, they get higher in risk. And so the returns increase, the median funded ratio increases to just over 70% at the end of ten years. But, at the same time, the variation increases a lot. So we have increasing risk as the number of the portfolio increases an increasing return, as well. Now this is sort of the fundamental assumption of finance, which is that the more risk you take, the more reward you get.

George Diehr:
Yeah.

Robert McCrory:
Go ahead.

Priya Mathur:
Just looking at this, it doesn't look like the downside risk increases that much. It just looks like the upside risk increases.

Robert McCrory:
And that's an excellent point. And what's happening here. Oh. This. What's happening here is that the actuarial cost is getting so high, at that point, that it is pumping money into the fund as fast as it can.

Priya Mathur:
The contribution rates, you mean?

Robert McCrory:
Yes. Yeah, at that.

Priya Mathur:
Okay. So they're making up for investment losses?

Robert McCrory:
Right.

Priya Mathur:
So this is not showing, cause it's showing. Okay. It's showing …

Robert McCrory:
We'll get to the next graph will be cost. And so it's a good thing to point out. Generally speaking when you simulate actuarial costs going forward in a plan, you will see a floor of somewhere around 30 to 40% on the funded ratio, just because, if the actuarial contributions are being made, the actuarial contribution gets so high they can offset any potential loss on the remaining small pool of assets. You know, so. Good news is that there is not a lot of downside risk. The bad news is the downside risk is reflected in an upside cost risk.

George Diehr:
I don't know if I agree. We'll have to look at that chart. But, yeah, I was going to, Priya's point is very good. Even, so Portfolio Number Eight, except for the 90th percentile, is really dominant. And the 90th percentile isn't that much worse than the 90th percentile of Portfolio Number One. I mean, it really is right that, now, I jumped ahead and I will.

Robert McCrory:
Okay, so.

George Diehr:
Maybe we ought to go to, why don't we go to base case on the employer contribution? And skip, and then come back to the funded ration on the weak case?

Robert McCrory:
Okay. Fair enough. Go to the …
George Diehr:
All right.

Robert McCrory:

So this is the base case employer contribution. And you'll notice here that the, that this dotted line represents the current average employer contribution. And, as Allan pointed out, this is like a super average for everything in sight. Everything in the PERF. And you can see that one of the things that comes to me is all of these portfolios are producing higher employer cost at the end of ten years than we are currently experiencing. Even the riskier ones. But you'll notice that at the end of ten years what's happening is that the median cost is generally declining to be maybe level with increasing risk. So, the more you risk, the more you get.

Allan Milligan :
I think it's, remember I said earlier that the increased contributions due to the asset losses were baked into our modeling of … That's why that median is above the current level. Current average level. It's because of those asset losses. Our contributions have not yet caught up to the asset losses. So, that's why you're seeing, that looks like a really odd result. And I, you know, it sort of really struck me the first time I saw it. So, if you're wondering why the median contribution under all of these cases is higher than the current, well, that's because the contributions are going up. We already, we just said that.

George Diehr:
Yeah. But, as I look at this again, the 80th percentile of Number Eight, Portfolio Number Eight, the 80th percentile is almost as good as an of the rest of them. Eightieth percentile up at the top. And, the 90th percentile is, well, it's bad, but it's bad on. There, we're all in trouble on all of them. I mean, my point is it looks like there's only about a 20% chance that we would be worse off with Option Eight, than we would with any of the. Or, I mean, less. I'd argue less than 20%. I don't know where the crosser would be, but maybe 15%. One out of six or seven or something, that the risk is here, would leave us in worse case in both funded ratio and contribution rate.

Richard Roth:
Well, there's really two things happening here, as both Bob and Allen described. Contribution rates are going up to fill the gap, and that helps all portfolios. The second thing going on is that for the base case numbers there is a return to risk. So, for the base case …

George Diehr:
Yeah.

Richard Roth:
… there is a linear relationship between return at risk that over a longer time period helps you out.

George Diehr:
Right.

Richard Roth:
That's what we're seeing.

George Diehr:
Right.

Richard Roth:
And, that's why we've also designed this 30% weak growth case which Bob will show the candlestick charts for that as well, and that's an entirely different story that we can see.

Robert McCrory:
I think there's one other point to be made, and that is that remember that the board and actuarial offices had adopted a very aggressive smoothing policy. That, that … you got it? That ends up. Can we turn it down a little bit? Gees, I'm sorry. I am causing no un-end of problems, it's my own incompetence here. They've adopted a very aggressive smoothing policy, which, you know, does smooth some of these variations out. So there's an awful lot of the effect that happened in this intervening ten years that has been pushed out beyond the threshold. This is one of the limitations of having only a ten year model. And that was something that Allan talked about, about earlier.

So, the other thing that you're not seeing is the volatility that may occur during the ten years while only looking at it at the end of ten years. But, in general, the main point is that in the base case you generally, the more you risk the more you get. Now, if we go to the weak growth case. Let's see here. Now it won't go back one. I'm trying. It doesn't have slow, so. No. I've seen this thing here. You know, I can't do this with my garage door either.

Richard Roth:
Slide six.

Farouki Majeed:
Will you look at funded ration on the …?

Farouki Majeed:
Wait. That's okay then.
Allan Milligan
That's what was going on. She's taken control.

Robert McCrory:
When I back out in the car I can't even do this with my garage door. But I kept, I hand it to my wife and she'll do it, it works.

Now, in the weak growth case what we're seeing is again that, you can see the level of funded ratio in the dotted line. Only now the more risk you take, the worse it gets. And this is the fundamental theorem of real life. Which is the more risk you take, the more you lose. And you can see that what happens is that all these funded ratios are again below where we are now, and what's happening is that in this more crummy economic scenario, the additional risks you take punish. And, so, this is kind of one of the explicit possibilities that's being built into the model this time.

If we go to employer contribution, one more thing. And we see in the employer contribution, again, this is where the usual relationship that we were talking about before about risk and return doesn't hold any longer. It's been inverted. That as you take more risk, not only to the cost on certainty increase, but the cost level increases.

Priya Mathur:
Can I ask a question about exactly what 30% weak growth case means? Does that mean that 30% of the years are weak growth years, or you've assumed a 30% hit on every year?

Richard Roth:
It means that we created the simulation and the probability of a recession occurring in a given year, and that simulation was 30%.

Priya Mathur:
And how does that compare to really …

Farouki Majeed:
The long term average somewhere in the 15 to 20% range. So, this is high.

Priya Mathur:
This, okay, so this is …

Farouki Majeed:
So, what we did was when, when you increase it to 30%, then what would happen to the return? So the return distribution, instead of being six to seven and a half percent under the 30% scenario would be some range like the four and a half to six percent kind of range.

Priya Mathur:
So you're …

Farouki Majeed:
So that's what that 30% is doing here.

Priya Mathur:

So you're assuming in the future is 50 to a 100% worse than, than our experience?

Farouki Majeed:
Than the, yeah, than the long term history.

Priya Mathur:
Than the long term history.

Richard Roth:
Right. It, it results in expected returns for the mixes that are from a 100 bases point to over 300 bases points lower than in the base case.

Priya Mathur:
Okay.

Farouki Majeed:
And, now, this is, what this is going to do is that it will impact the formulation of the decision factors, so that you're giving some consideration to the downside risk. But, in the final analysis the way you indicate your preference in the portfolios of the rank, the portfolios you'll be choosing will be the portfolios under the base case. And that ranges from, you know, the normal 67.5% that we have shown. So it's just a way to kind of try to make a more meaningful impact to the downside risk in the decision factor framework. Because of all this molding and other things. That if it, if it didn't do that, we don't think that the downside impact gets sufficiently incorporated into the decision factor framework.

Priya Mathur:
Right. So you're trying to dampen our enthusiasm for the more aggressive cases. Which, which …

Farouki Majeed:
Yeah. So, for … I'm going by the whole sum of experience and this stuff.

Priya Mathur:
Yeah.

Farouki Majeed:
So we're trying to see how to, you know, incorporate that and make it more clarity.

Priya Mathur:
It's good. I'm … much.

Joseph Dear:

The capital market line, that assumption that the more risk you take the more reward you get, doesn't mean because you take more risk you will get more return. It means you can. You can get outcomes below that average line that are worse. Because you've taken more risk you get more loss. And our experience up to the financial crises was you take the risk you get the reward. What the financial crises taught us is you can get that highly unlikely really severe downturn and then you're not moving on along that median line anymore, you've dropped way down, and you have to move up, the return has to move up and it can take you decades to get back to what was lost in that downside. So this is one way of making a pessimistic, an explicit pessimistic assumption and then saying what happens to the funded ratio and the contribution rate.

Farouki Majeed:
Another way of looking at it is that, you know, when you're at 65% the downside rates becomes a lot more kind of, you know, for example, if you fall to 40%, if a similar thing happens over the next, in this timeframe then digging out of that hole becomes almost impossible. So you have the very meaningful risk to the sustainability of the fund. I think is what we are trying to say.

George Diehr:
I mean, as I look at these we're in, if you have the weak growth case, there's nothing very pretty here. I mean, you can pick Number One or something like that a be a little better off, but well what's the return on Number One? Because right away you start, return on number. I'd have to walk back here. And, tomorrow you. Return on Number One is what?

Farouki Majeed:
Low sixes.

George Diehr:
Low sixes. Okay. Calculate the employee contribution. You're going to assume low sixes? That's too big a number for me to even compute. I mean, it's huge. It's already, it's so many points, I'd even drop in a half a percent, or a quarter percent is huge. You drop down to the sixes? So.

Farouki Majeed:
Not to be, I think in the, once you're …in the next session we will be demonstrating how the decision factor framework is going to work.

George Diehr:
Yeah.

Farouki Majeed:
And you will see there that if you're, let's say if you score even on all four, then you're going to end up with a portfolio that's somewhere in the middle. So it's

not, it's not that, that low. So all it is doing is that it is giving some weight to this downside.

George Diehr:
I'm looking for the strong growth case. Where is? Where is that? I mean, that's very pess … I find this very pessimistic. And, and, so if you. Yeah. If you buy, if you buy into this it's, you know, you might as well start making other plans or something. I mean. It just doesn't seem like. And, really, weak growth case, it doesn't matter which portfolio we have, we're in a pretty big hole.

Joseph Dear:
At 60%, 65% funded, yes.

George Diehr:
Yeah.

Joseph Dear:
And the first …

George Diehr:
Because we're starting, we're starting from a hole.

Joseph Dear:
The numbers, as one of my bosses used to say, the numbers are the numbers.

George Diehr:
Yeah.

Joseph Dear:
And, another observation that my mom, facts are stubborn things. Yeah.

George Diehr:
But pick, but pick, take these …, pick portfolio one or eight on the weak growth case in terms of funded ratio, they're all dismal. I don't know whether, you know, the 80th, the 80th percentile on Number One is 45%. It's pretty bad. The 80% on Number Eight looks like it's about 39%. Well, they're both disasters in my opinion.

Richard Roth:
What's important to keep in mind is …

Richard Roth:
I'm jumping ahead to what I'm going to say later, but I can just say it again then. Which is, that we're using the weak growth case to construct just two of the decision factors. And we're using the base case to construct the other two decision factors, and then we relate all four decision factors to each candidate

mix. So, really, we believe what we end up with is a balanced approach. But it's just that when you make the choice between say return oriented or risk oriented it just makes the choice more transparent and we really see what we're deciding. So that's really the objective in what we're doing here.

Tony Oliveira:
I just want to make a comment. I know everybody knows this, and I hate to be the guy that keeps throwing reality numbers in here. And I know you have to do this. But, the one thing that is the other given that must be considered, the employer contribution is not the untapped well that it was in the past. There is a point, there is a point that you reach that employers cannot make those contributions. So, you can get really conservative and you can really look at the negatives potential. But I'm just telling you that there are employers out there with those kind of increases will be facing a factor that you haven't even figured into this yet, employers that cannot contribute at those levels. And it will change your scenarios, because there either has to be major reduction in the workforce because going to second tier will not remedy any of the suggestions that we are putting here today. And I just, I want you to know that that needs to be in your equation because you just can't go to that well. We can be, I won't be here tomorrow, so I want to get this said. That you can go to be very, very conservative and very low risk, but your employers will not be able to meet those demands. So, just keep that in mind when you make these choices.

Allan Milligan
And, I think it's important to understand that all of the modeling that you'll see tomorrow assumes that the employers will in fact make the contributions that the model produces. And that, if they can't make those contributions, then something will have to give somewhere.

Robert McCrory:
I'm going to just move along here quickly. You won't have to make a decision based on these candlestick charts. What you'll be doing is weighting your preferences for a four decision factors. The decision factors are broken out into two groups. There's a cost group and a funding group. The two cost members and the two funding members each feature a risk and a reward ember. So, in the case of cost, for example. Let's go to Number 11. Thank you.

So, in the case of cost, or in case of funding, I should say, the risky factor that the, or the, I guess it should be the reward fact will be let's achieve a funding goal, let's try to get 90% or more funded within ten years. And those portfolios that are highly likely to get us there will be favorably scored.

On the other hand, one of the, the other, it's pair. It's risk pair. Would be to avoid a funding shortfall. So let's be sure that we stay above about 45% funded. And those portfolios that go in, only infrequently below 45% funded, they'll be well scored. The ones that frequently go below 45% funded will be penalized.

Similarly with regard to contributions, employer contributions, the reward factor will be, let's try to get the average employer contribution below 19%. That's going to favor riskier portfolios. But, at the same time, the risk oriented pair of the decision factor would be to avoid contribution surprises. So let's avoid costs to the employer at any year above 40%. Scary number, but there it is.

So, what you'll be doing tomorrow is to weight these decision factors and pick more or less conservative approaches. And the software will then go in and find the portfolio, one through eight, that does the best balanced job of setting up of meeting the priorities that you have set.

The candlestick charts you're seeing now are really sort of your background to understand kind of what's going on in these things.

Now with that, Rick, you'll be going through more of the application and decision.

Richard Roth:
Right. So, when we looked at the candlestick charts, those were charts of decision factors measured as of a point in time. And that point in time was ten years from now. The next couple graphs will be, instead of a point in time, they're going to be across time. So we get to see how things evolve through time. In fact, over the next 19 years. And the next two graphs are entirely based on the base case. It's not about the 30% weak growth case.

George Diehr:
So. I just have a question about it. So, when you're running one of these simulations, so you run a simulation for a particular case, and you run how many simulations on a thousand?

Richard Roth:
We run a thousand.

George Diehr:
One thousand. Two thousand.

Richard Roth:
Then you, out of that thousand …

George Diehr:
Would you count the number of times the funded ratio falls below 38 per … I'm looking at Page 15.

Richard Roth:
Right. Right. It's the …

George Diehr:
Below. So it was. You would count the number of times, the proportion of times it fell outside of these ranges?

Richard Roth:
Right.

George Diehr:
You don't give it sort of on average, it's above that. But you look at the 1,000 and anytime it gets out of, violates one of these fences, then you count them?

Richard Roth:
That's basically right. You're looking at out of the thousand times, how many times did it meet the goal and how many times did it come up short.

George Diehr:
Right. Okay.

Richard Roth:
That's how we measure it.

All right. So, looking at the first graph. This is looking at the percentiles, expected funded ratio. This uses the current policy portfolio, which is essentially Portfolio Seven. And, using the base case distribution. So it starts off. You look right here. It starts off where we are right now. Which is 65%. And then the yellow line, which cuts across here, is the 50th percentile. So, everything above that yellow line has equal likelihood as everything below the yellow line. Now, looking at the pink line, which is the 25th percentile, we can see that the probability of employer contribution rates being lower than they are now in 19 years.

Farouki Majeed:
Funded ratio. It's funded ratio.

Richard Roth:
Oh. Funded ratio. I'm sorry. Funded ratio. Let me start over again here. There's a lot going on here. And it's probably hard for some of you to see, as well, so let me start over.

Okay, starting on the pink line. The probability of the plan being fully funded, meaning a 100% or better, in 19 years is 25%. So we can see that right there. That end point? And then, again, going back to that yellow line, the probability of the plan being 70% funded or higher in 19 years is 50%. And that's, that's 75% there in 19 years. So, key point to bring up here is that the current policy portfolio is estimated really to make somewhat limited actuarial progress if it just earns its expected return of 7.4%.

Tony Oliveira:
Rick?

Richard Roth:
Yes.

Tony Oliveira:
That's a great point. Again, I'm sorry. But we got to think. So what we're really saying by that statement you just made, with the increases that are given right now that we've laid out in that particular scenario, those employer contributions at the new higher levels under that scenario would stay that way for 19 years.

Richard Roth:
They are at a higher level.

Tony Oliveira:
Yeah.

Richard Roth:
Well that's actually the next slide. The next slide is about the …

Tony Oliveira:
But … but make sure you comment about that when we get there.

Richard Roth:
Okay.

Tony Oliveira:
Because that's in, because this all about planning them. This is not a two year plan.

Richard Roth:
Right.

Tony Oliveira:
This is a pretty long term plan here.

Richard Roth:
This is a long term plan. Right.

Tony Oliveira:
Okay.

Richard Roth:

This is working. So the next slide, this is about, Mr. Oliveira, what you were talking about, which is employer contribution rates. Again, looking 19 years out, using base case, and essentially the current policy portfolio. Yellow line, again, is the 50th percentile. So, looking at the pink line, probability of employer contribution rates being lower than they are in 19 years is only 25%. So let's go find that point. So that is, right there. Right? Then returning to the yellow line. Probability of employer contribution rates being 27% or higher in 19 years is 50%, which is a lot higher. And you can probably see it.

Tony Oliveira:
Right.

Richard Roth:
So, to really distill this down, I think the key message of these two graphs is that at an expected return of 7.4% we really do need employer contribution rates to go up to just have the funded ratio go from 65% to 70%.

Priya Mathur:
Can I, can I ask a question? From the liability side, what assumptions are we making as to sort of the base employment, you know, the base for the payroll versus retirements and are we changing our assumptions, are we assuming current situation is static?

Allan Milligan
Sure. For the calculation of our liabilities we have an assumption. For the calculation of the liabilities we do it on a closed group. Which means that we're not, we're not assuming anything about future hires.

Priya Mathur:
Okay.

Allan Milligan :
On the terms of when we convert that into a contribution rate. We do assume that the overall payroll will grow at three and a quarter percent per year. But, you know, first we calculate a dollar amount of contribution. Then we convert it into a rate by dividing it by what we think is the overall payroll. The dollar amount of the contribution is not sensitive to future hires.

Priya Mathur:
Okay.

Robert McCrory:
If I could add to that? That's true for what Allan does for his actuarial valuations year to year. In this projection we're assuming one full replacement of retiring and terminating members. So we're assuming a level workforce and we haven't done anything in the way of decreases in payroll or workforce. And we're

assuming that pay increases are in accordance with actuarial assumptions. So that's what this particular group assumes. Now, for other jurisdictions of the states we have assumed either, you know, we have assumed furloughs, we've assumed decreases in payroll, we've assumed decreases in covered workforce that can be done. But, (a), we haven't done it here, and, because a lot of those things are still unknown, and (b), it's unclear how much it would really effect the asset allocation per se'.

Now, coming back to Mr. Oliveira's point, let me make the point before you need to. What we're saying here is that based on the current asset allocation and no change, that the median cost will be like 10% higher in 19 years than it is today. Which represent about 50% relative increase in overall average costs. Now, as Allan pointed out, you're mileage may differ. So, you know, different plans will experience different impacts depending on whether general service or safety, how well funded they are, and the other demographic and the linguistics that apply.

Tony Oliveira:
I guess here's a better way to say it and, maybe to help me a little bit. Is given, and you're right, we are starting, we've got to all understand, we are starting from a deficit position because it's not like starting at a 100% funded. We are starting after losses. So, given that we've already, in our particular county's case, I'll just use it as a model. That we're looking at somewhere around a 50% increase in employer contributions over the next three years. Laying it out in this pattern, probability of staying at that level, it appears to me that the 50% chance that it's going to be out there for at least 15 years.

Farouki Majeed:
Fifteen years.

Robert McCrory:
Yes. And if, it …

Farouki Majeed:
Somewhere between …

Priya Mathur:
My …

Robert McCrory:
If not actually increasing more.

Tony Oliveira:
Yeah. And that's, again, I cannot reiterate it enough for planning, for agencies, both state and locals, this is a huge thing for them to understand, is that we're going to get there, and then we're going to be there for a long period of time.

Robert McCrory:
And, if there is downsizing in the active workforce it makes it worse.

Tony Oliveira:
Yeah.

Robert McCrory:
Because your retirees and in-actives aren't going anywhere. You're just trying to rebuild your assets on a narrowing payroll base.

Tony Oliveira:
Right. Good point.

Richard Roth:
Okay. So, now, let's jump into the details of exactly how we define each decision factor. So, decision factors one and two relate to the funding level. Three and four relate to employer cost. And, I think as we all realize now, after all these discussions, it's important to note that none of these decision factors are achieved with a 100% certainty. They're all measured in terms of probabilities. So, I'm just going to walk through each of these in detail. So, Decision Factor One, the goal is for the funded ration to improve to 90% or better at the end of ten years. And to put this into perspective, again, Portfolio Seven, which is most like the current policy portfolio. It has a 23% probability of achieving that at the end of 10 years.

Decision Factor Two states that funded ratio is to remain above 38% at the end of ten years. So, in other words, it would be 38% or better. Portfolio Seven has an 81% probability of meeting that goal.

Then, Decision Factor Three, average employer contribution is to be below 19% at the end of ten years. And then, again, Portfolio Seven has only a 22% probability of achieving that goal.

Then the last Decision Factor Number Four, which is to stabilize the contribution level, states that the average employer contribution should not increase above 40% at the end of ten years. And, Portfolio Seven has a 75% probability of achieving that goal.

George Diehr:
Just say again on the Decision Factor Two for your example? The Portfolio Seven has a X percent chance of being close?

Richard Roth:
It's 81% chance. So, why?

George Diehr:
I'm looking at Page 13, Expected Funded Ratio. Current … fund worse case. You've go the 95th percentile is at 40.

Richard Roth:
Okay. So portfolio. So we need to measure it at 38.

George Diehr:
I'm, I'm, you know, I'm looking at the chart. It looks like for ten, we're going only ten years out, not 19.

Richard Roth:
Right. Say 38, you're slightly below the, the, uhm.

George Diehr:
Well it looks to me like at 2020 the 95th percentile crosses, is right on 40%. And that's why I'm. Assuming I'm looking at the right.

Richard Roth:
Oh, oh, right, right. Okay, my, huh, it was my wonderful associate just clarified for me again, the difference is, again, two and four are designed on the 30% weak growth case.

George Diehr:
Oh. Oh.

Richard Roth:
And, and one are three are based on the base case. So.

George Diehr:
Oh. I'm sorry. Okay. So I'm looking at the wrong. They're not. Okay. We see base case here, but we're not seeing the weak.

Richard Roth:
Right. So, like if you …

George Diehr:
Okay.

Richard Roth:
If you look at, well, the probabilities that I gave you …

George Diehr:
It's anyway, so.

Richard Roth:

… for one and three will map back.

George Diehr:
Yeah. Okay.

Richard Roth:
To these graphs. But, two and four will not.

George Diehr:
Yeah. The, are you going, I think your candlestick, or box pots, or, they look to me like burning the candle at both ends. But, in any event. Which. That, or a stick of dynamite with two fuses. And, you know. Those are great because it allows you to do a cross, a cross portfolio comparison. Are you, will you, will you reproduce those, can you generate those in the simulation to show what? Somehow what they look like?

Richard Roth:
The …

George Diehr:
Well, I guess you've already shown us.

Richard Roth:
The information in the candlesticks are really based on the simulations.

George Diehr:
Yeah. Yeah.

Richard Roth:
It's one in the same thing.

George Diehr:
Okay, so we already have, we have that.

Farouki Majeed:
That's how we get the distributions. You know. So.

George Diehr:
Yeah. Yeah. Okay. So. All right.

Richard Roth:
Right. So the candlesticks, the visual you see, are, somebody was talking about a cake? Well, they're in, they baked into the cake for the decision factors. It's the same thing.

Allan Milligan :

We're covering a lot of different cakes here.

Richard Roth:
Well that's a different cake. All right.

George Diehr:
All right.

Richard Roth:
Yes.

Question from male panel member:
These are very important decision factors. But, I want to, I just feel I have to ask the question. Are there other of these decision factors, why, and if so, why were these selected over those others and so on?

Robert McCrory:
If I could? When this process at CalPERS started I think we ended up with seven, we had initially about seven decision factors. And, an eighth has been added in some states. For example, performance versus peers was a decision factor for awhile. Back in the late 1990's, trying to get to a 130% funded was a decision factor, and the reason being that that would enable benefit improvements. That was something that some board members wanted. Over time here at CalPERS this has been winnowed down to these four as being the ones that seemed to be the most dispositive when we're looking at this, and to be most easily understood, and best able to express the concerns of the board. Now there's a fifth decision factor that some states are using now. And that is based on liquidity. And what they're doing is they're saying, we're going to penalize portfolios that have a sufficiently high allocation to illiquid assets that it forces our allocation to deviate from policy under certain circumstances. And that requires a pretty sophisticated insight economic model that PCA developed for us to use, and we just haven't been doing that here. But.

Farouki Majeed:
I don't know. A simple, simplistic basis. You can achieve that by just capping the allocations to the privates. Which is what, you know, our model is.

Robert McCrory:
Yes. Absolutely.

Comment by male panel member:
Thank you.

Richard Roth:
Okay. So moving onto the next slide. You know, I think we've covered most of the slide, but, I'd also like to add that, you know, a caveat which I think Bob

mentioned briefly, which is that this is a quantitative process. It gives an answer. Or, is designed to give an answer. But, it's not the final answer. In the end we need qualitative discussion about the various candidate mixes and how they are represented in terms of these decision factors to really arrive at a final decision. And, I'd also like to say, reiterate again, decision factors one and three are return focused. Two and four are risk focused. And then just a technical note here that also by using the 30% weak growth case we've also incorporated some non normally distributed returns into the process, which is one of our goals this year to do that.

All right, and then just some final commentary on really the 30% weak growth case, which is to refer back to Lorne Johnson's presentation in which he described that there really have been economic regimes in evidence over the last 40 years and they do have significant impact in particular equity returns. And we've seen low return regimes in two out of the last four decades, in the seventies and more recently in the two thousands. And we do recognize that CalPERS has had an equity centric portfolio in the more recent past. So we're here today to really look at our current asset allocation and really figure out where to go next with it.

So that concludes this presentation. And the schedule is, I believe, that I'll just keep going here. Unless we have any further comments or questions?

Henry Jones:
Yeah. Question. You mentioned, Richard, that this is quantitative but we didn't have an opportunity to get to the qualitative. So, we'll go through it, I guess we hit some buttons and numbers are going to come up?

Richard Roth:
Yes. Yeah, what we're going to do …

Henry Jones:
So, from that point, then, how to we oppose our qualitative decision on all the quantitative data?

Richard Roth:
Okay, what we'll do, and I'll cover some of this next, is we're going to, each of you will have a clicker, an electronic clicker to register your weight reached decision factor. And then we have a system in place that's going to accumulate that weighting and then rank the candidate mixes based on that weighting. And that will give an answer. But, when we see that answer, really what we should all do is, you know, have a discussion about what it means. And, if we're comfortable with it or not. So, just because an answer comes out of the process, again, that's not the final answer. And, if you say, wait a minute, I want to, you know, I voted this way for this round and you say, well, you know, maybe I want to give it another shot. Then we can possibly …

Farouki Majeed:
So, one way to do this is what you're saying, when you vote your preferences you will see the portfolio is being ranked. So, let's say you were in the middle of the road and Portfolio Number Three or Four is going to be ranked as the top one, and then you'll have a second and third portfolio. Then you look at Portfolio Number Three, you look at its characteristics, you look at what kind of growth rates it has, what are the allocations in the other areas that we talked about in terms of macro risk distributions. You look at the allocation to the illiquid, what does that amount to, what kind of, you know, liquidity and income and other characteristics does it have. So I think you want to have that kind of discussion around it. And, and, my view is that hopefully the board wants to develop some consensus around it. And, so on. So.

Henry Jones:
So, that, that's …

Joseph Dear:
We'll try it one more time. So suppose Portfolio 14 is the one that the consensus choice and you look at that, Mr. Jones, and you go, wow, that may reflect my going in assumptions about my preferences with respect to how high contribution rates should go and what the funded said it should be, but that portfolio doesn't return nearly enough and its impact on contribution rates could be so severe as to, I'm not comfortable with that. That's where you have the judgment. That Rick says, the system will give an answer, as Rick said, it's not the final answer. That's where the board has to discuss, wow, Portfolio 14 seems to be the one that numerically comes out the best, but our judgment is, in light of all the factors you have to consider, that might not be the best one. And, so that's where you insert your judgment.

Henry Jones:
So there's a button to say this is my final answer?

Joseph Dear:
Well, at some point you're, in December you're going to adopt a policy, and that, that will be it.

Henry Jones:
So, yeah, yeah.

Joseph Dear:
But, another way of saying it is, if you'll. And we probably can do. But, as you see how this, the voting goes, it's a way of compressing the views of 12 people quickly. And then what you all need to do is then look at the result and say, how does that, does it make sense from the totality of the information and the perspectives that you bring to bear.

Farouki Majeed:
And then we would take those instructions and then come back in December with some final recommendations. So, you aren't making a final selection tomorrow.

Richard Roth:
Okay. So, if there aren't any more questions, we'll move ahead. And, we'll bring up the next presentation. So, just to highlight the topics that I'm going to cover in the next presentation, first, is decision factors. We've gone over those, I think, in great detail. But I'll just walk through them real quickly again. And then, secondly, I'll explain how you the board assign a level of importance or weight to each of the decision factors. And the way you do that, again, is you're going to have an electronic clicker that you use to communicate your assigned weight to each one. Then I'll explain how we aggregate your individual weights for each decision factor into a consensus weight. And then, lastly, I'll explain how we then translate that consensus to decision factor weight into a ranking of the candidate mix portfolios.

And I'm going to skip slide two for now and go to slide three. So, again, just very quickly. Decision factor one is about improving the funding level. Decision factor two is about avoiding further deterioration in that funding level. Decision factor three is about trying to minimize the employer contribution rate. And then decision four is about stabilizing the employer contribution rate.

So, getting into the nitty-gritty of how we actually come up with numbers for the decision factors. This slide shows how you actually assign weights to each one of them. And, we're using technology that makes sure that all the weights add up to a 100%. And that the combination of one and two add to 50%, and then three and four also add to 50%. And we decided to have one and two and three and four both add to 50% because the funded ratio and employer contribution rates are really linked together and they're really equally important. So, it's logical just to assign equal weights. So the …

Farouki Majeed:
Oh, huh, one …

Richard Roth:
Okay.

Farouki Majeed:
Just one moment. You could point out that we did not have that balance the last time around. It was much more free-flowing. So you could be at a 70 or 80% order on a single factor. So, with this kind of attempts to balance out the impact of the factors.

J J Jelincic:

The … why the 50/50? I mean, it could well be that funding rates are far more important to some people than the employer contribution rates. Or, you could be telling me the employer contribution rate is the key driver. So, I'm not, why 50/50? I mean, why are you saying those are equally important?

Richard Roth:
Well, I would say it's part of the judgment in the process. But, if you feel that, that, really, in a way they're the same thing. If you, if you're highly concerned about employer contribution rates being too high, then if you apply a high weight to one and three, then you get there anyway. Or, if you're concerned that, at this point, you just don't want a lot of risk, that you want to stabilize where we're at, then assigning a higher weight to two and four does the same thing. So, having, having flexibility on the relative weights between the two really in the end would not make much difference.

Farouki Majeed:
It doesn't really constrain you, so much. Other than it just balances out the impact of the risk factors. So.

Henry Jones:
We're closer.

Farouki Majeed:
Okay.

Richard Roth:
Okay, let's …

Farouki Majeed:
… for example.

Richard Roth:
Let's, uhm.

Farouki Majeed:
Demonstrate the 45 and the five?

Richard Roth:
Okay. So what the slide …

J J Jelincic:
Can you do the one and three? Can you explain the one and three again?

Richard Roth:
Okay, so. Looking up here. We can see again we've got, we've got the fact the decision factors are based on two different things. One, funding level, and the

other is employer contribution rate. So, for funding level you're going to assign a weight to decision factor one, using the clicker. And then let's say you assign a weight of 10%. What the system will do, it will make sure that one and two add to 50%. So, it's going to automatically assign a weight of 40% to two. And then similarly for three and four will then have, will close the pole, or the voting process, and then we'll reopen it to decision factors three and four. Meanwhile the system is memorizing, you know, the first weighting for one and two. So then you'll assign a weight for three, which is to have a lower employer contribution rate. And, if you say assign a weight of 30% to that, because that's very important to you, then the system will have then assigned a weight of only 20% to four. So the two add up to 50%.

J J Jelincic:
Okay, but it. And, if my belief is that the employer rate is essentially the end all and be all, I can't make that a 100% of my?

Richard Roth:
No. You can't make that a 100% directly.

J J Jelincic:
Then you can't make it 51%?

Richard Roth:
Well, you can make it 45. And then by, if it's that important to you, by also playing a high weight on decision factor one, you're voting basically the same direction for lower employer contribution rates. It's the same thing framed I a slightly different way.

Farouki Majeed:
For example, what this would prevent is the fact that you would vote a 100% on a single factor. Right? So, if you didn't have this sort of constraints, this balance, you could vote a 100% on decision factor one and zero on everything else. So, which means, you know, what you are voting for is just the highest risk portfolio. So, then, that means you are not taking into consideration the other risk factors properly in consideration.

Joseph Dear:
Uh. Let me? I think.

J J Jelincic:
Well, maybe it is appropriate. If I was to try … that is the big one factor, how do you say it's inappropriate to not weigh the other one?

Joseph Dear:
Because a pure risk portfolio that drives the funding ratio below 40% essentially creates a self-fulfilling condition where the fund will never meet its obligations.

So there is a risk in the funding ratio that is so great that it really needs to be considered, even if you're prepared to wager everything. But let me try to illustrate. If you're concern, just hypothetically, is contribution rate, then you can weight these factors to maximize that. By saying you want the highest possible funded ratio and the lowest possible contribution rate. And that amplifies in the direction you want to go. Is that right, Mr. McCrory?

Robert McCrory:
That's right.

Joseph Dear:
So you would put a 45 on decision factor one and a 45 on decision factor. Four? I can't?

Robert McCrory:
Three. Three.

Farouki Majeed:
Three.

Joseph Dear:
Okay. So you'd put 90% in the direction of trying to keep the contribution rate as low as possible. And that would bias it towards the risk of your portfolios.

Richard Roth:
So, to help you out, what we're going to do at the beginning of the actual session tomorrow is we're going to do three demo sessions. And, just to demonstrate the inner play between the decision factors. So, first session is we're going to have everybody apply a 25% weight to both one and three. And then the system will apply 25% to everything, one, two, three, and four. And we'll see that we get a result which is a balanced type ranking among the candidate mixes. Then, second practice session, what we're going to do is we're going to make it risk focused. So we're going to have you vote on the higher weight for two and four than one and three. And then we'll see that the more conservative candidate mixes come out on top. Then the third and last practice session will be return focus. So then we're going to have you assign a very high weight to both one and three, compared to two and four. And we'll see that the more return focused portfolios, which are six, seven and eight, will come out on top. So I think doing that will give you a very good feel for how these work, and how you might want to assign your weights in the actual session, which then would follow.

Farouki Majeed:
So, Mr. Jelincic, if I may, to answer your question, you still have the option of voting 45 on one and 45 on three. And that would still get you the highest risk portfolio. Which, in other case, you might have got by just voting a 100% on one.

But, at least when you balance it out across all members, this probably has a more sort of a consensus approach as opposed to, huh.

J J Jelincic:
But, if my goal was to actually minimize employer contribution, wouldn't I be heavily on two and three? Rather than one and?

Farouki Majeed:
No. So, to minimize employer contribution then you would vote the maximum on that, which is 45.

J J Jelincic:
Okay.

Farouki Majeed:
And, and then on decision factor one you would vote 45, as well. Yeah. Because those, both of those two give you the.

J J Jelincic:
But, if my goal is to improve the funded ratio, the 90, that would suggest higher contributions.

Farouki Majeed:
No. It's higher return. It shows a higher returning portfolio.

J J Jelincic:
A higher return.

Joseph Dear:
Right.

Farouki Majeed:
Yes. It shows a higher return.

George Diehr:
Right. Voting 45 …

J J Jelincic:
Okay.

George Diehr:
Voting 45 on one and 45 on four represents. Is that flake, flake, or something's going to, it's schizophrenic or something. I mean. I don't know what you end up picking. Maybe it picks on in the middle if you?

Comment by male panel member:

You would.

George Diehr:
Yeah. Okay.

J J Jelincic:
Being schizophrenic is not necessarily bad.

Allan Milligan:
Yeah. J J, if you really want to change the overall funding level, then we need to talk, not just about the asset allocation, but also about the actuarial policies. Because, to a certain extent, if you, you know, get high contribu … higher rates of return on the actuarial, I'm sorry, I mean, asset allocation, better investment returns, I'm going to undo the funding thing, the funded status a little bit by lowering employer contributions. So, what you really kind a, you can't achieve everything through asset allocation. You also have to look at the funding policies. But I'm listening very carefully.

J J Jelincic:
I read the policy. I can only do 90% of it through asset allocation.

George Diehr:
Okay.

Farouki Majeed:
I think, huh, I don't have the comment here.

Allan Emkin:
Just from some historical perspective, the original years when this was done there was a 100% vote. And, in fact, that was a crucial part of the discussion to set up the discussions that allowed for truly a negotiation between the parties who wanted to accomplish different objectives. And I think what this is intended to do is sort of shortcut that a little bit. But, effectively, you have two decisions. Two of those are growth decisions, and two of those are volatility decisions. And you can vote for growth, or you can vote for volatility, or some combination of the above without all getting fancy. It really gets down to that simple metric.

J J Jelincic:
Okay. But it make, I mean, I obviously used a 100-zero, you know, as the extreme. But, I mean, it may be that 60-40 is more reflective of where I actually am. And this says I'm going to do it 50-50 as part of baking the cake.

Richard Roth:
I would say that's where the qualitative discussion comes in, which it's a combination of an answer comes out of this thing, you know. We may or may not

exactly like the first answer, but there is an opportunity for a second answer. You know, resulting from discussions.

George Diehr:
Shall we move to closing comments by Joseph Dear?

Joseph Dear:
Well, one of our objectives, Mr. Chairman, was to generate a discussion. And that, I think we have succeeded. At least as much as we expected, if not more. Part of that discussion reveals the gravity of the choice in front of you and the difficult options that lie in front of the system in terms of meeting its objective to earn a rate of return which is sufficient to enable the payment of the benefits that have been promised to the beneficiaries. What we've tried to set up are what those major choices look like and to give you an idea tomorrow of how we'll ask you to express those choices and then the discussion that which will follow from that. Farouki started the day thanking the staff that contributed, but we did not mention Sharon Noss (sp?), who was instrumental in bringing these meetings forth and …

George Diehr:
Yes. Thank you, Sharon.

Joseph Dear:
… like getting the books together and distributed to making sure that all of us get our materials in on time. So I want to add a thanks to her, and to thank each of the board members for your attention in the questions and the quality of the dialogue. I look forward to coming back in the morning, and.

Farouki Majeed:
I would also like to thank the …

Joseph Dear:
Sure.

George Diehr:
Right. And, but, but, don't … I don't want to cut you off. Are you done? I don't want to adjourn yet. We have one person from the public who wishes to speak, Richard Jacobs, City of Orange. Are you still? You can sit up at the presenter table there.

Richard Jacobs:
Thank you very much. I have some comments to make but I will be brief. I'm the finance director with the City or Orange, my name is Richard Jacobs and I'm here to provide you with a perspective from local entities contribution rates point of view.

Some of those comments have already been made earlier. But, just briefly, I would like to recommend that the board not reduce the discount rate as the employer contribution rates are going up anyway. In the City of Orange our rates are going up by 10% in 2011. They'll be going up a couple of percent in 2012, and then another 10% in 2013 with no change to the discount rate. If the discount rate were to change by a quarter of a percent from 7.75 to 7.50, our rates would go from 25% for a miscellaneous plan to 38% for a miscellaneous plan, and our safety plan would go from 37% to 55%. And I think it's important for the board to understand that having local agencies set aside 55 cents out of every dollar for retirement costs is simply untenable. You've talked earlier about employment rates in terms of how many employees we have. I can assure you if we are paying a 55% retirement rate, we will have far fewer employers and that will cause our rate to go up even higher. So, I guess the best analogy I can come up with kind of a doctor's requirement to take a Hippocratic oath in terms of investing, and that is to do no harm to our employer rates. And, by that I think the, one of the options that needs to be considered, and I'm sure it will be, is to do nothing, to keep the portfolio as it is, to continue to assume a discount rate of 7.75 (seven seventy-five), which will help employer rates be stabilized.

In terms of the decision factors spoken of late in the day, I think from a employer's point of view, obviously, decision factors three and four are the most important and to get to that rate I think we have to stick with our current discount rate of 7.75 (seven seventy-five). So, thank you for your time.

George Diehr:
Thank you. All right. We are adjourned. Thank you all.

End of Segment 4.